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Department of Parasitology and Parasitic Diseases
Agricultural College of Lublin
Head: Doc. Dr. Eugeniusz Żarnowski

Bernard BEZUBIK and Stefan FURMAGA

The helminth parasites in *Macacus rhesus* Audeb., from China

Helmintofauna *Macacus rhesus* Audeb., pochodzących z Chin

In May, 1958 the Lublin Laboratory for the Production of Sera and Vaccines bought in China a lot of monkeys of the species *Macacus rhesus* Audeb. for the production of the vaccine against the Heine - Medina disease. During the period of acclimatization a number of the monkeys died and were examined anatomo-pathologically and parasitologically. During the period from June 16, 1958 till August 11, 1958 parasitological examinations were conducted on 100 monkeys, whereby attention was paid to all internal organs.

The general extensity of invasion was 72 per cent. Seven per cent of the monkeys were invaded with trematodes, 4 per cent — with cestodes and 71 per cent — with nematodes. Table I shows the extensity and intensity of invasion with the separate species of worms.

Free of parasites were 28 per cent of monkeys, with one species of parasites were invaded 32 per cent of monkeys, with two species — 21 per cent, with three species — 11 per cent, with four species — 6 per cent, and simultaneously with 5 species of parasites were invaded 2 per cent of monkeys.

Anatomo-pathological lesions were found only in cases of the presence of liver flukes (dilation of the bile ducts, thickening of their walls, cirrhosis hepatis, dilation of the gall-bladder, sometimes general jaundice) and *Streptopharagus pigmentatus* (at great invasion: catarrh of the alimentary tract).

The species of trematodes and cestodes found by us are sufficiently well described in the literature and our material does not differ markedly from the data cited by other authors; some ne-

matodes, however, found by us are not sufficiently enough described in the literature and our material differs sometimes from that hitherto described — therefore we are presenting a concise description which enables species classification and the diagnosis of the nematodes.

Macacus rhesus proved to be a new host to *Ogmocotyle indica* (Bhalerao, 1942) Ruiz, 1946, *Ternidens deminutus* (Railliet et Henry, 1905), *Trypanoxyuris bipapillata* (Gedoelst, 1916) and *Streptopharagus pigmentatus* (Linstow, 1897) Railliet et Henry, 1918.

Table I
Extensity and intensity of invasion

No	Species of parasite	Examined	Invaded	%	Intensity	Habitat
1.	*Fasciola hepatica* L., 1785	100	5	5	1—14	liver
2.	*Ogmocotyle indica* (Bhalerao, 1942)	100	3	3	12—200	duodenum, small intestine
3.	*Bertiella studeri* (Blanchard, 1891)	100	3	3	1— 2	duodenum
4.	*Cysticercus tenuicollis* (Rud., 1810)	100	1	1	1	mesentery
5.	*Oesophagostomum bifurcum* (Crepl., 1849)	100	55	55	1— 50	caecum, large intestine
6.	*Ternidens deminutus* (Raill. et Henry, 1905)	100	21	21	1—100	caecum, large intestine
7.	*Trypanoxyuris bipapillata* (Ged., 1916)	100	1	1	1	caecum
8.	*Streptopharagus pigmentatus* (Linst., 1897)	100	24	24	1—320	stomach, duoden. caecum, small & large intestine
9.	*Trichocephalus trichiurus* (L., 1771)	100	27	27	1— 25	caecum, large intestine
10.	*Trichocephalus* sp.	100	2	2	1	caecum

TREMATODA

Fasciola hepatica L., 1758

Hosts: *Ruminantia, Rodentia, Marsupialia, Primates,* sometimes other mammals.

Habitat: bile ducts of the liver and other organs.

Geographical distribution: cosmopolitan.

In our material *F. hepatica* was found in the bile ducts of the liver in 5 per cent of the examined monkeys, in numbers ranging from 1 to 14 specimens.

Ogmocotyle indica (Bhalerao, 1942) Ruiz, 1946

Synonym: *Cymbiforma indica* Bhalerao, 1942.

Hosts: *Ovis aries* L., *Capra hircus* L., *Bos taurus* L.

Habitat: the whole alimentary tract, sometimes bile ducts of the liver.

Geographical distribution: India.

We found *O. indica* in the stomach (once), duodenum (3 times) and in the small intestine (twice) in 3 per cent of *Macacus rhesus* (new host), in numbers ranging from 12 to 200 specimens.

CESTODA

Bertiella studeri (Blanchard, 1891) Stiles et Hassall, 1902

Synonyms: *Bertia studeri* Blanchard, 1891; *Bertia satyri* Blanchard, 1891; *Taenia (Bertia) confera* Meyner, 1895; *Taenia studeri* (Blanchard, 1891) Braun, 1896; *Taenia satyri* (Blanchard, 1891) Braun, 1896; *Bertiella satyri* (Blanchard, 1891) Stiles et Hassall, 1902; *Bertiella confera* (Meyner, 1895) Stiles et Hassall, 1902; *Bertia polyorchis* Linstow, 1905; *Bertiella cercopitheci* Beddard, 1911.

Hosts: *Homo sapiens* L., *Simia satyrus* L., *Anthropopithecus troglodytes* (L.), *Hylobates hoolock* Herlan; *Cercopithecus pygarythrus* Cuvier, *C. smithi* Matschie, *C. neglectus*, Schl. *C. fuliginosus* (Geoffr.), *Macacus rhesus* (Audeb.), *Hamadryas hamadryas* L., *Cynomolgus synomolgus* L., *C. irus* L., *C. sinicus* L.

Habitat: intestine.

Geographical distribution: Africa, South Asia, Philippine.

B. studeri was found by us in the duodenum of 3 per cent of monkeys, in numbers ranging from 1 to 2 specimens.

The material we collected was scanty because it consisted of one scolex and several fragments of the strobila; therefore we did not succeed to observe all details required for the correct identification of the species. However, taking into consideration the available data and the fact that in *Macacus rhesus* hitherto only this species of the genus *Bertiella* was described, we diagnosed the tapeworm as *Bertiella studeri* (Blanchard, 1891) Stiles et Hassall, 1902.

Cysticercus tenuicollis Rudolphi, 1810

Hosts: *Primates, Ruminantia, Rodentia* and other mammals.

Habitat: mesentery, peritoneum and other organs.

Geographical distribution: cosmopolitan.

One *Cysticercus tenuicollis* — the larva of the tapeworm *Taenia hydatigena* Pallas, 1766 — we found in the mesentery of one monkey. The scolex of our specimen is armed with two rows of hooks, 28 in number. The shape and dimensions of the hooks correspond completely to the data in the literature.

NEMATODA

Oesophagostomum bifurcatum (Creplin, 1849) Railliet et Henry, 1906

Synonyms: *Strongylus bifurcus* Creplin, 1849; *S. attenuatus* Leidy, 1856; *S. cynocephali* Molin, 1861; *Oesophagostomum brumpti* Railliet et Henry, 1905; *Oe. attenuatum* (Leidy, 1856) Railliet et Henry, 1906; *Oe. stephanostomum* Chewlett et Corté, 1908; *Oe. apiostomum* Leiper, 1911 part.; *Oe. maurum* Hung, 1926.

Hosts: *Simiae, Homo sapiens* L.

Habitat: small and large intestines.

Geographical distribution: Africa, Central Asia.

We found in our material *Oe. bifurcum* in the caecum (43 times) in the large intestine (32 times) in 55 per cent of the monkeys, in numbers ranging from 1 to 50 specimens.

Male: Length of the body 11.7 to 15.5 mm, width 0.32 — 0.46 mm. The oesophagus attains dimensions 0.56 — 0.65 × 0.13 — 0.2 mm. The size of the spicules 1.22 — 1.46 mm, of the gubernaculum 0.13 — — 0.14 × 0.025 — 0.03 mm.

Female: Length of the body 12.9 — 18.7 mm, maximal width 0.46 — 0.67 mm. The oesophagus 0.59 — 0.67 × 0.13 — 0.2 mm. The anus is located at the distance of 0.17 — 0.24 mm from the posterior end of the body; the distance between the anus and the vulva 0.16 — — 0.28 mm. Eggs attain the size 0.071 — 0.076 × 0.039 — 0.044 mm.

Ternidens deminutus (Railliet et Henry, 1905)

Synonyms: *Triodontophorus deminutus* Railliet et Henry, 1905; *Globocephalus macaci* Smith, Fox et White, 1908.

Hosts: *Homo sapiens* L., *Macacus sinicus, M. cynomolgus.*

Habitat: large intestine.

Geographical distribution: Africa, Asia.

In our material we found *T. deminutus* in the large intestine (16 times) and in the caecum — new localization (10 times) in 21 per cent of *Macacus rhesus* (new host), in numbers ranging from 1 to 100 specimens.

Male: Length of the body 8.6 — 11.4 mm, width 0.37 — 0.49 mm. The size of the buccal capsule 0.15 — 0.2 (width) × 0.13 — 0.18 mm (length). The oesophagus attains the size 0.7 — 0.85 × 0.22 — 0.27 mm. The spicules of uniform length 1.16 — 1.22 mm, the gubernaculum 0.11 — 0.13 × 0.036 — 0.04 mm.

Female: Length of the body 8.5 — 12.7 mm, width 0.49 — — 0.79 mm. The size of the buccal capsule 0.17 — 0.22 (width) × × 0.13 — 0.18 mm (length). The oesophagus attains 0.73 — 0.92 × × 0.18 — 0.37 mm. The length of the tail 0.18 — 0.31 mm; the vulva is situated at the distance of 0.79 — 0.98 mm from the posterior end of the body. The size of the eggs 0.064 — 0.066 × 0.034 — 0.038 mm.

Trypanoxyuris bipapillata (Gedoelst, 1916)

Synonym: *Oxyuris bipapillata* Gedoelst, 1916; *Enterobius bipapillatus* (Gedoelst, 1916) Baylis, 1923.

Hosts: *Anthropopithecus troglodytes* Blum., *Cercopithecus sabaeus* L.

Habitat: intestines.

Geographical distribution: Africa.

In our material we found in one *Macacus rhesus* (new host) in the caecum one female of *T. bipapillata.*

In spite of the absence of males it seems to us that the morphological data of this single specimen of female offer a basis to classify it to the discussed species.

Streptopharagus pigmentatus (Linstow, 1897) Railliet et Henry, 1918

Synonym: *Spiroptera pigmentata* Linstow, 1897.

Hosts: *Cercopithecus albogularis* Skyes, *C. diana diana* L., *C. leucampyx* Fisch., *Macacus* sp., *Hylobates leucogenys* Ogilby, *H. hoolock* Harlan, *Pithecus fuscatus* Blyth, *Marmota marmota.*

Habitat: stomach and intestines.

Geographical distribution: Asia.

We found this species in our material in the stomach (12 times), in the duodenum (20 times), in the small intestine (11 times), in the

large intestine (9 times) and in the caecum (7 times) in 24 per cent of *Macacus rhesus* (new host) in numbers ranging from 1 to 320 specimens.

Male: Length 27 — 34 mm, width 0.72 — 0.78 mm. Length of the thick-walled pharynx 0.31 — 0.42 mm, oesophagus 6.1 — 7.2 mm in length. The spicules of various length: the longer is 4.56 — 5.16 mm long, the shorter 0.66 — 0.82 mm; the gubernaculum 0.072 — 0.084 mm. The size of the tail 0.36 — 0.48 mm.

Female: Length of the body 45 — 54 mm, maximal width 0.84 — 1.24 mm. The pharynx attains the length 0.3 — 0.56 mm, the oesophagus 7.38 — 9.0 mm. The size of the tail 0.5 — 0.64 mm. The vulva is located in front of the middle of the body. Eggs: 0.032 — — 0.038 × 0.017 — 0.022 mm.

It seems that the *Streptopharagus* sp. described by Chyský (1958), but not classified by him because of lack of literature, is the species *S. pigmentatus*.

Trichocephalus trichiurus (L., 1771)

Hosts: *Homo sapiens* L., higher monkeys.

Habitat: large intestine and caecum.

Geographical distribution: cosmopolitan.

In our material *T. trichiurus* was found in the caecum (26 times) and in the large intestine (4 times) in 27 per cent of the monkeys, in numbers ranging from 1 — 25 specimens.

Trichocephalus sp.

In the material studied by us we found in the caecum 2 females of the whipworm, distinctly different from *Trichocephalus trichiurus* which were by us not classified to this species in view of the scarcity of the material and absence of males. We present a short description of these specimens.

Female: Length of the body 16.1 — 18.3 mm, maximal width 0.28 — 0.34 mm. The oesophagus 11.8 — 13.1 mm. The proportion of the length of the anterior part of the body to the total length of the nematode about 2 : 3. Size of the eggs: 0.086 — 0.088 × 0.034 — — 0.039 mm.

Authors' address:
Katedra Parazytologii W. S. R.
Lublin, Akademicka 11

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STRESZCZENIE

Autorzy zbadali sto małp, należących do gatunku *Macacus rhesus* Audeb., importowanych z Chin do produkcji szczepionki przeciwko chorobie Heinego-Medina.

Ogólna ekstensywność inwazji wynosi 72%. Ekstensywność inwazji dla przywr i tasiemców jest bardzo mała (7 % i 4 %), natomiast dla nicieni 71 %. Ekstensywność i intensywność inwazji poszczególnymi gatunkami pasożytów ilustruje tabela I.

Stwierdzono następujące gatunki pasożytów: *Fasciola hepatica* L., 1758; *Ogmocotyle indica* (Bhalerao, 1942) Ruiz, 1946; *Bertiella studeri* (Blanchard, 1891) Stiles et Hassall, 1902; *Cysticercus tenuicollis* Rud., 1810); *Oesophagostomum bifurcum* (Crepl., 1849) Railliet et Henry, 1906; *Ternidens deminutus* (Railliet et Henry, 1905); *Trypanoxyuris bipapillata* (Gedoelst, 1916); *Streptopharagus pigmentatus* (Linstow, 1897) Railliet et Henry, 1918; *Trichocephalus trichiurus* (L., 1771); *Trichocephalus* sp.

Jednym gatunkiem pasożyta zarażone były 32 małpy, dwoma gatunkami 21 małp, trzema — 11, czterema — 6 i równocześnie pięcioma gatunkami pasożytów zarażone były dwie małpy. 28 małp było wolnych od pasożytów. Zmiany anatomo-patologiczne stwierdzono jedynie w wątrobie w przypadku obecności *Fasciola hepatica*, oraz w jelicie przy dużej inwazji *Streptopharagus pigmentatus*.

W części szczegółowej autorzy podają przegląd znalezionych pasożytów; zwięzłe opisy dotyczą jedynie tych nicieni, które w literaturze potraktowane są w sposób niedostateczny lub różnią się od nich danymi morfologicznymi.

Stwierdzono, że *Macacus rhesus* jest nowym żywicielem dla *Ogmocotyle indica* (Bhalerao, 1942) Ruiz, 1946, *Ternidens deminutus* (Railliet et Henry, 1905), *Trypanoxyuris bipapillata* (Gedoelst, 1916) i *Streptopharagus pigmentatus* (Linstow, 1897) Railliet et Henry, 1918.